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Investment Opportunities in Regenerating Black Spruce Are Greatly Affected by Site

Site quality is an important factor to be considered when regenerating stands of black spruce. It may determine how a stand is to be regenerated, and thus affect regeneration costs. On poor sites natural regeneration often can be obtained at little cost, whereas on good sites expensive site preparation and planting may be required. An investment made now in establishing a stand, whether by planting or by obtaining natural regeneration, is expected to yield future returns. The amount and timing of these returns vary considerably with site. The economic analysis presented here shows that site greatly affects the margin that can be invested profitably in regenerating black spruce stands.

The values of expected returns at various ages from a fully stocked stand of black spruce were obtained by applying a stumpage price of \$6 per cord to the cordwood volumes in the normal yield tables given by LeBarron.^{1/} Experience with these tables indicates that they provide a good estimate of actual yields from well-stocked, relatively even-aged stands of black spruce. From these value yields for good, medium, and poor sites (site index 39, 33, and 26 at age 50, respectively), the margins available for profitable investment in stand establishment at the beginning of each rotation were computed for discount rates of 2, 3, 4, and 6 percent for a range of land values, using a soil expectation value formula. Constant annual management expenses of \$0.30 per acre were assumed. The margin available for stand establishment is the maximum amount per acre that could be invested in establishing a well stocked black spruce stand on land of a given value and still provide at least the stated rate of return from managing the stand. The results of this analysis are summarized in figure 1.

The most striking fact brought out is the difference between sites in the amount that can be profitably invested in regeneration. On poor sites, even the smallest investment in stand establishment is not profitable at discount rates above 2 percent. With a land value of \$3 per acre and a discount rate as low as 2 percent, an investment of more than \$5 per acre in regenerating poor sites would not be profitable. In contrast, at the same 2-percent discount rate but with a higher land value of \$10 per acre, more than \$40 per acre could be profitably invested in regenerating good-site black spruce stands.

As figure 1 shows, the forest landowner can profitably invest much more in establishing stands on good sites than on poor sites, even if good sites have a considerably higher value. At a discount rate of 2 percent, he can invest

^{1/} LeBarron, Russell K. Silvicultural management of black spruce in Minnesota. U.S. Dept. Agr. Cir. No. 791. 60 pp., illus. 1948. (p. 30., trees over 3.5 inches d.b.h.).

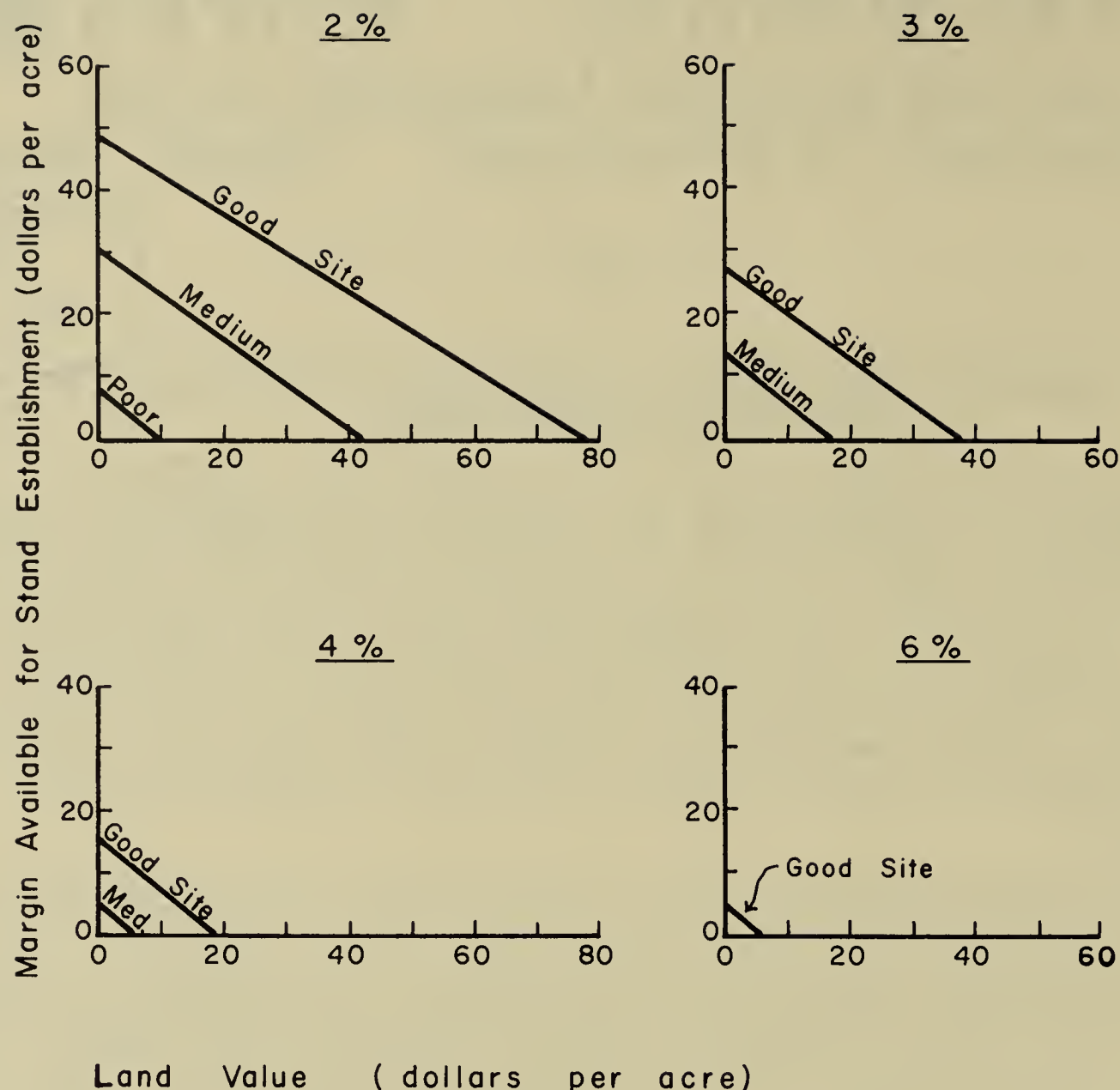


Figure 1.--Margin available for establishing a stand of black spruce for a range of land values on three site classes (good, site index 39 at 50 years; medium, site index 33; poor, site index 26) and at four discount rates. Stumpage price, \$6 per cord; annual management expenses, \$0.30 per acre.

\$20 per acre more on medium sites and almost \$40 per acre more on good sites than he can on poor sites, given the same land value for all sites. How much more he can invest on the better sites will depend upon the discount rate he uses, the land value, and his stumpage price and cost expectations. A similar analysis could be made for other stumpage prices and management costs.

In evaluating stand establishment practices from an investment viewpoint, not only the total cost of stand establishment but also the expected returns must be considered. This analysis demonstrates the importance of site and land value on regeneration investment decisions and points out the need for determining site as a measure of the land's productivity before making such decisions.